

# □ MN102H730F , MN102H73G , MN102H73K

<b>Type</b>	MN102H730F	MN102H73G (under development)	MN102H73K (under development)
<b>ROM (x8-bit)</b>	External	128 K	256 K
<b>RAM (x8-bit)</b>	10 K	10 K	12 K
<b>Package</b>	TQFP128-P-1414B *Lead-free	TQFP128-P-1414A *Lead-free	
<b>Minimum Instruction Execution Time</b>	With main clock operated	58 ns (at 3.0 V to 3.6 V, 34 MHz)	
<b>Interrupts</b>	<ul style="list-style-type: none"> <li>• RST pin • Watchdog • NMI pin • Timer counter 0 to 9 underflow • Timer counter 10 to 14 underflow</li> <li>• Timer counter 10 to 14 compare capture A • Timer counter 10 to 14 compare capture B</li> <li>• ATC ch.0 to 1 transfer finish • ETC ch.0 to 1 transfer finish</li> <li>• External 0 to 7 • Serial ch.0 to 4 transmission • Serial ch.0 to 4 reception • A/D conversion finish</li> </ul>		
<b>Timer Counter</b>	<p>Timer counter 0 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM0IO pin; system clock (BOSC)</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 0</p> <p>Timer counter 1 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM1IO pin; timer counter 0 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 1</p> <p>Timer counter 2 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM2IO pin; timer counter 1 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 2</p> <p>Timer counter 3 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM3IO pin; timer counter 2 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 3</p> <p>Timer counter 4 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM4IO pin; system clock (BOSC)</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 4</p> <p>Timer counter 5 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM5IO pin; timer counter 4 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 5</p> <p>Timer counter 6 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM6IO pin; timer counter 5 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 6</p> <p>Timer counter 7 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM7IO pin; timer counter 6 output</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 7</p> <p>Timer counter 8 : 8-bit × 1</p> <p style="padding-left: 20px;">Clock source ..... 1/2 of system clock (BOSC) frequency; system clock (BOSC); 1/4 of system clock (XI) frequency; TM8IO pin</p> <p style="padding-left: 20px;">Interrupt source ..... underflow of timer counter 8</p>		

<b>Timer Counter (Continue)</b>		<p>Timer counter 9 : 8-bit × 1            Clock source ..... 1/2 of system clock (BOSC) frequency; 1/64 of system clock (BOSC) frequency; TM9IO pin; timer counter 8 output            Interrupt source ..... underflow of timer counter 9</p> <p>Timer counter 10 : 16-bit × 1 (timer output, event count, input capture, PWM output, 2-phase encoder input)            Clock source ..... underflow of timer counter 8, 9; TM10IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM10IOA pin/TM10IOB pin (1 ×, 4 ×)            Interrupt source ..... underflow of timer counter 10; timer counter 10 compare capture A; timer counter 10 compare capture B</p> <p>Timer counter 11 : 16-bit × 1 (timer output, event count, input capture, PWM output, 2-phase encoder input)            Clock source ..... underflow of timer counter 8, 9; TM11IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM11IOA pin/TM11IOB pin (1 ×, 4 ×)            Interrupt source ..... underflow of timer counter 11; timer counter 11 compare capture A; timer counter 11 compare capture B</p> <p>Timer counter 12 : 16-bit × 1 (timer output, event count, input capture, PWM output, 2-phase encoder input)            Clock source ..... underflow of timer counter 8, 9; TM12IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM12IOA pin/TM12IOB pin (1 ×, 4 ×)            Interrupt source ..... underflow of timer counter 12; timer counter 12 compare capture A; timer counter 12 compare capture B</p> <p>Timer counter 13 : 16-bit × 1 (timer output, event count, input capture, PWM output, 2-phase encoder input)            Clock source ..... underflow of timer counter 8, 9; TM13IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM13IOA pin/TM13IOB pin (1 ×, 4 ×)            Interrupt source ..... underflow of timer counter 13; timer counter 13 compare capture A; timer counter 13 compare capture B</p> <p>Timer counter 14 : 16-bit × 1 (timer output, event count, input capture, PWM output, 2-phase encoder input)            Clock source ..... underflow of timer counter 8, 9; TM14IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM14IOA pin/TM14IOB pin (1 ×, 4 ×)            Interrupt source ..... underflow of timer counter 14; timer counter 14 compare capture A; timer counter 14 compare capture B</p>
<b>Serial Interface</b>		<p>Serial 0, 1 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)            Clock source ..... 1/8 of timer counter 6 underflow frequency; 1/8, 1/2 of timer counter 0 underflow frequency; external pin</p> <p>Serial 2, 3 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)            Clock source ..... 1/8 of timer counter 2 underflow frequency; 1/8, 1/2 of timer counter 4 underflow frequency; external pin</p> <p>UART × 4 (common use with serial 0 to 3)</p> <p>I<sup>2</sup>C × 2 (common use with serial 1,3; single master)</p>
<b>Multiply-and-Accumulate</b>		16-bit sign × 16-bit sign + 40-bit sign
<b>I/O Pins</b>	<b>I/O</b>	104 <ul style="list-style-type: none"> <li>• Common use : 59 (use of full address, address data separate 16-bit mode)</li> <li>• Common use : 76 (use of address 16-bit, address data separate 8-bit mode)</li> </ul>
<b>A/D Inputs</b>	10-bit × 12-ch. (with S/H)	
<b>D/A Outputs</b>	8-bit × 4-ch.	
<b>PWM</b>	16-bit × 5-ch. (timer counter 10 to 14)	
<b>ICR</b>	16-bit × 5-ch. (timer counter 10 to 14)	
<b>OCR</b>	16-bit × 5-ch. (timer counter 10 to 14)	
<b>Notes</b>	Address / data separate bus interface; 8 / 16-bit bus width selectable; burst ROM interface; SRAM interface	

See the next page for electrical characteristics, pin assignment and support tool.

## Electrical Characteristics

### Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDDopr	VI = VDD or VSS, output open f = 34 MHz, VDD = 3.3 V			60+10 $\alpha$ *	mA
Supply current at STOP	IDDS	Pin with pull-up resistor is open all other input pins and Hi-Z state input/output			70	$\mu$ A
Supply current at HALT	IDDH	pins are simultaneously applied VDD or VSS level f = 34 MHz, VDD = 3.3 V, output open			30+10 $\alpha$ *	mA

(Ta = -40°C to +85°C, VDD = AVDD = 3.3 V, VSS = AVSS = 0 V)

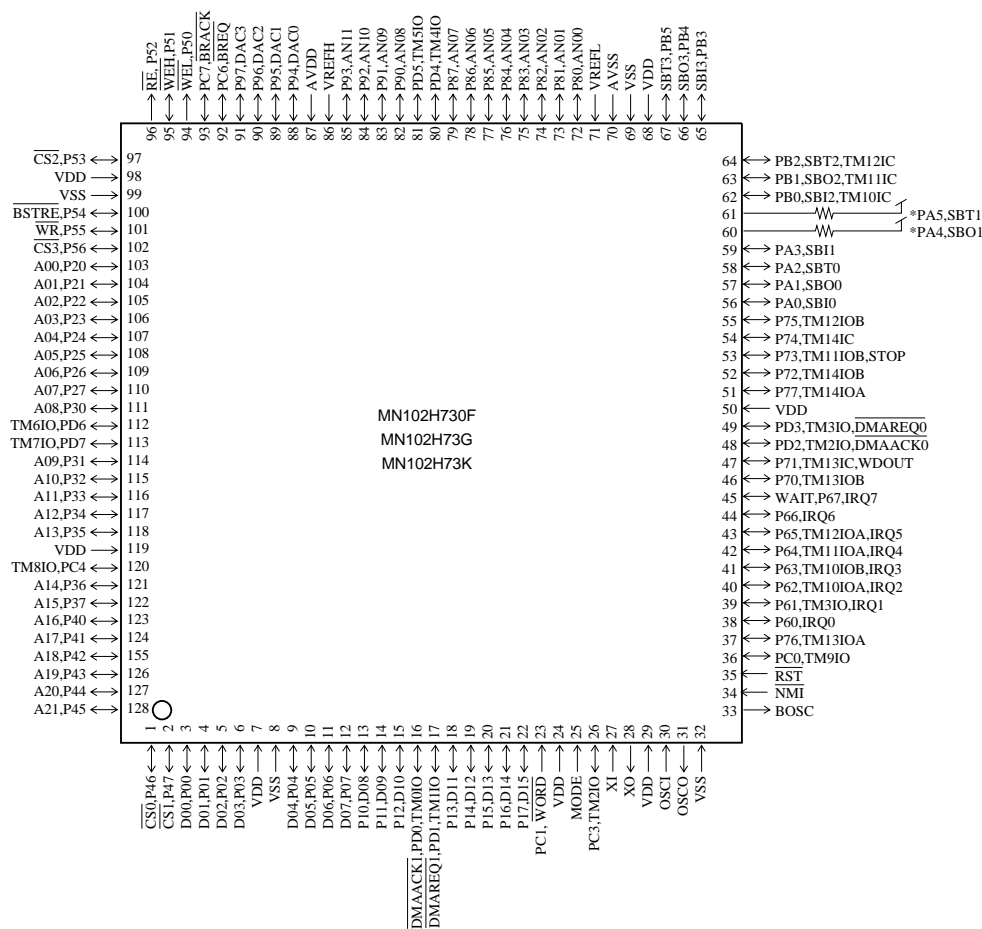
\* " $\alpha$ " depends on products .

MN102H73G/73K/730F  $\alpha = 0$

MN102HF73G  $\alpha = 1$

MN102HF73K  $\alpha = 2$

Pin Assignment



TQFP128-P-1414A \*Lead-free

TQFP128-P-1414B \*Lead-free

\* Use 4.7 kΩ to 10 kΩ.

Support Tool

In-circuit Emulator	PX-ICE102H73-128P1414	
Flash Memory Built-in Type	Type	MN102HF73G (under development), MN102HF73K (under development)
	ROM (× 8-bit)	128 K / 256 K
	RAM (× 8-bit)	10 K / 12 K
	Minimum instruction execution time	58 ns (at 3.0 V to 3.6 V, 34 MHz)
	Package	TQFP128-P-1414B *Lead-free

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